

### ABSTRACT

A path through a data network is calculated that accounts for priority levels of already-established paths. For example, when a request is received to calculate a path from a source node to a destination node through a data network to support a connection designating a particular priority level and a particular resource amount/type, e.g., a bandwidth requirement, traffic engineering information including priority level information of links in the data network is reviewed. Potential new paths are determined taking into account priority level information associated with data network links. Of the determined paths, the path selected is preferably one having the least pre-emptive effect on lower priority traffic. The bandwidth reservation information for each data network link is determined along with the maximum bandwidth of each link and the available bandwidth at each priority level. Links with insufficient resources are eliminated from consideration. Other "costly" paths, e.g., too many router hops, may also (but not necessarily) be eliminated. For the remaining candidate paths, determinations for each link are made: which lower priority levels will be affected by the setup of the new path, (e.g., on which priority level existing paths will be pre-empted), how much reserved bandwidth will be pre-empted at each priority level, and how much free bandwidth is available at the lowest priority level. A path is selected that reduces or preferably minimizes some aspect of pre-emption, e.g., the selected path (1) pre-empts the lowest priority level path(s), (2) pre-empts the least amount of reserved bandwidth, and/or (3) has the most amount of unreserved bandwidth at the lowest priority level.